

# **Decision Document**

**Solid Waste Management Unit B-22b  
Building 101-44 East Catchment Pit  
Hawthorne Army Depot  
Hawthorne, Nevada**



**September 2000**



Hawthorne Army  
Depot



# Decision Document SWMU B-22b

September 2000

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ENVIRONMENTAL PROTECTION

The selected remedy is protective of human health and the environment. It has been shown that a complete pathway to human health and the environment does not exist, and there is no potential for an exposure pathway to be completed in the future.

**U. S. Army**

18 OCT 2000

Anne L. Davis

Anne L. Davis  
Lieutenant Colonel, U.S. Army  
Commanding

**State of Nevada**

9 MARCH 2001

Paul Liebendorfer

Paul Liebendorfer  
Chief, Bureau of Federal Facilities

# Decision Document

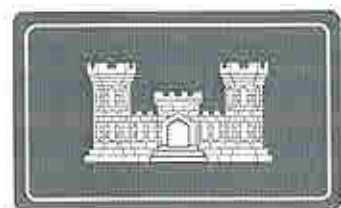
Solid Waste Management Unit B-22b  
Building 101-44 East Catchment Pit  
Hawthorne Army Depot  
Hawthorne, Nevada



September 2000



Hawthorne Army  
Depot



**Decision Document**  
**SWMU B-22b**  
**Building 101-44 East Catchment Pit**  
**HAWTHORNE ARMY DEPOT**  
**HAWTHORNE, NEVADA**

**1.0 Introduction:**

This decision document describes the rationale for the proposed closure of SWMU B-22b, building 101-44 East catchment pit, at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. This document was prepared by the U.S. Army Corps of Engineers, Sacramento District, with the help of HWAD for the Nevada Department of Environmental Protection (NDEP).

Tetra Tech, Inc. (Tt), and Ecology and Environment (E&E) were tasked by the US Army Corps of Engineers, Sacramento District (USACE), to perform remedial investigations and ground water monitoring at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. These tasks were conducted from 1993 through 1997, primarily at solid waste management units (SWMUs) designated by the Army and the Nevada Division of Environmental Protection (NDEP). The NDEP is the lead regulatory agency for environmental issues at HWAD. The purpose of the sampling was to determine the extent and degree of environmental impacts, if any, associated with activities performed at each SWMU. The primary goal of the investigation was to assess the environmental impacts and to report the findings, present conclusions, and recommend any remediation, if necessary.

With guidance from the NDEP, basewide proposed closure goals (PCGs) for soil were established as acceptable levels so that SWMU closure could be recommended and to assist in directing the investigative efforts toward those SWMUs where the target analytes were of greatest concern (Appendix A). These PCGs were used as action levels throughout this investigation and are used for comparison with the detected analytes in this report.

**2.0 Site History**

SWMU B22b is in the HWAD's central magazine area, on the southeast side of the 101 Production Area (Figure 1-1), and is an inactive unlined catchment pit located 140 feet northwest of Building 101-44 (Figure 1-2). The catchment pit measures 70 feet by 50 feet and is up to six feet deep. The catchment pit has been eroded and partially filled with windblown sand.

The USACE, HWAD, and the NDEP agreed to define the boundaries of each SWMU using annotated monuments and survey pins. As part of E&E's 1997 field investigations,

a survey monument was constructed and surveyed at SWMU B22b. A brass survey pin on the monument designates the monument number HWAAP-95-1996 and the SWMU number B22b. Three corner pins were set and surveyed to define the SWMU boundary, with the monument as the northwest. The location of these corner markers and the SWMU boundary are shown on Figure 1-2. The survey data for this SWMU are presented in Appendix B.

### **3.0 Site Conditions**

Soils encountered during E&E's investigation of SWMU B22b were composed mostly of fine to medium grained sands.

The catchment pit at SWMU B22b reportedly was in operation from 1940 to the early 1970s and received wastewater containing TNT, cyclotrimethylenetrinitramine (RDX), and Yellow D.

Based on the past uses of the catchment pit at SWMU B22b and on the observations made during the previous site inspections, the target analytes at this SWMU are known to be explosives and metals.

### **4.0 INVESTIGATIONS**

Site inspections of SWMU B22b were conducted by the USAEHA (1988), Jacobs Engineering (1988), and RAI (1992). During these inspections, evidence of TNT-stained soil was noted in the catchment pit. No investigation activities were conducted during these inspections, and no soil samples were collected from the SWMU at that time.

In 1994, sampling activities proposed by E&E for the remedial investigation at SWMU B22b included collecting and analyzing both surface and subsurface soil samples. One surface soil sample and one near-surface soil sample were collected from sample location HA01 at SWMU B22b. Sample location HA01 was in the southeast area of the catchment pit and was taken at the lowest elevation in the pit to assess the potential impact from the explosive wastewater that would tend to accumulate there. Figure 3-1 illustrates the sampling locations.

The subsurface investigation at SWMU B22b consisted of one CPT sounding with an adjacent sample boring, CPS01, drilled on the downgradient side of the catchment pit, as shown on Figure 3-1. The sounding was advanced to a total depth of 22 feet below ground surface (bgs).

In 1998 inconsistencies were showing up between the field screening tests of 1994 and the laboratory analysis of the same samples. Field screen samples indicated concentrations in excess of 30,000 mg/kg. However, laboratory results on the same samples showed less than PCG's or non-detect. With suspicion on the validity of the 1994 field test results, in January 1999 the USACE resampled the stained surface soil and had it analyzed by a laboratory.

Later in 1999 DZHC collected additional subsurface soil samples and had them analyzed by a laboratory.

## **5.0 Investigation Results**

The detected analytical results of the subsurface soil samples collected during E&E's remedial investigation of SWMU B22b. Arsenic (3.0 mg/kg to 4.2 mg/kg), barium (72 mg/kg to 84 mg/kg), total chromium (5.1 mg/kg to 9.5 mg/kg), and lead (4.1 mg/kg to 17.0 mg/kg) were detected in both subsurface soil samples collected at location CPS01. No other metals were detected in these subsurface samples.

RDX was detected in the subsurface sample collected from 9.5 feet bgs at a concentration of 11 mg/kg. No other explosives were detected in either of the subsurface soil samples collected from location CPS01 at this SWMU.

Based on the analytical results of E&E's remedial investigation at SWMU B22b, the surface, near-surface, and subsurface soils at this catchment pit contain detectable concentrations of arsenic, barium, total chromium, and lead that do not exceed their respective PCGs and are below their respective maximum background concentrations established during these remedial investigations (Tt 1997d). Therefore, at SWMU B22b, the detected metals arsenic, barium, total chromium, and lead, which are common metals in the Walker Lake Valley soils, are evaluated to be at naturally occurring concentrations near their background levels (appendix C).

The surface soil sample of the stained soil collected by USACE had no detection of explosive compounds. The two deeper soil samples by DZHC also did not detect any explosives contamination (appendix D). The SWMU has not been impacted by any COC.

## **6.0 Remediation**

No remediation action was required for this site.

## **7.0 Remediation Results**

N/A

## **8.0 Public Involvement:**

It is the U.S. Department of Defense and Army policy to involve the local community throughout the investigation process at an installation. To initiate this involvement, HWAD has established and maintains a repository library at the local public library. This repository includes final copies of all past studies and other documents regarding environmental issues at HWAD. As future environmental documents are made available to HWAD the repository shall be updated.

HWAD has solicited community participation in establishment of a restoration and advisory board (RAB). To date there has been insufficient response and HWAD has not

formed a RAB. HWAD has held open houses to inform the public of on going environmental issues. HWAD shall continue to solicit community involvement, and will establish a RAB should sufficient community interest be obtained.

## **9.0 Conclusions**

SWMU B-22b was backfilled with clean soil and should be closed and documented on the depot site master plan with no restrictions.

## 10.0 REFERENCES

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- Jacobs Engineering, 1988. RCRA Facility Assessment, Hawthorne Army Ammunition Plant, TES IV Work Assignment No. 433.
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- RAI. 1992. Site Screening Inspection (SSI) for the Hawthorne Army Ammunition Plant, Hawthorne, Nevada. Prepared for the US Army Corps of Engineers Toxic and Hazardous Materials Agency by Resource Applications, Inc., Falls Church, Virginia. December 1992.
- Tetra Tech. 1997a. Draft Quarterly Ground Water Monitoring Report, First Quarter 1997, Hawthorne Army Depot, Hawthorne, Nevada. April 1997.
- \_\_\_\_\_. 1997b. Quarterly Ground Water Monitoring Report, Second Quarter 1997, Hawthorne Army Depot, Hawthorne, Nevada. July 1997.
- \_\_\_\_\_. 1997c. Final Data Package with recommendations for future action, Group B solid waste management units, Hawthorne Army Depot, Hawthorne, Nevada, Volumes 1, 2a, and 2b. January 1997.
- \_\_\_\_\_. 1997d. Final Technical Memorandum Background Sampling at the Hawthorne Army Depot, Hawthorne, Nevada. March 1997.
- \_\_\_\_\_. 1997. Final Remedial Investigation Report, Hawthorne Army Depot, Hawthorne, Nevada. December 1997.
- USACE. 1995. Risk Assessment Handbook: Volume I Human Health Assessment (EM 200-1-4). USACE. June 1995.
- \_\_\_\_\_. 1999. Final Field Sampling Report, West 101 Production Area: Hawthorne Army Depot, Hawthorne, Nevada. April 1999.
- USAEHA. 1988. Final Report. Ground Water Contamination Survey No. 38-26-0850-88. Evaluation of Solid Waste Management Units. HWAAP, Hawthorne, Nevada. May 12-19, 1987 and August 1-5, 1988.

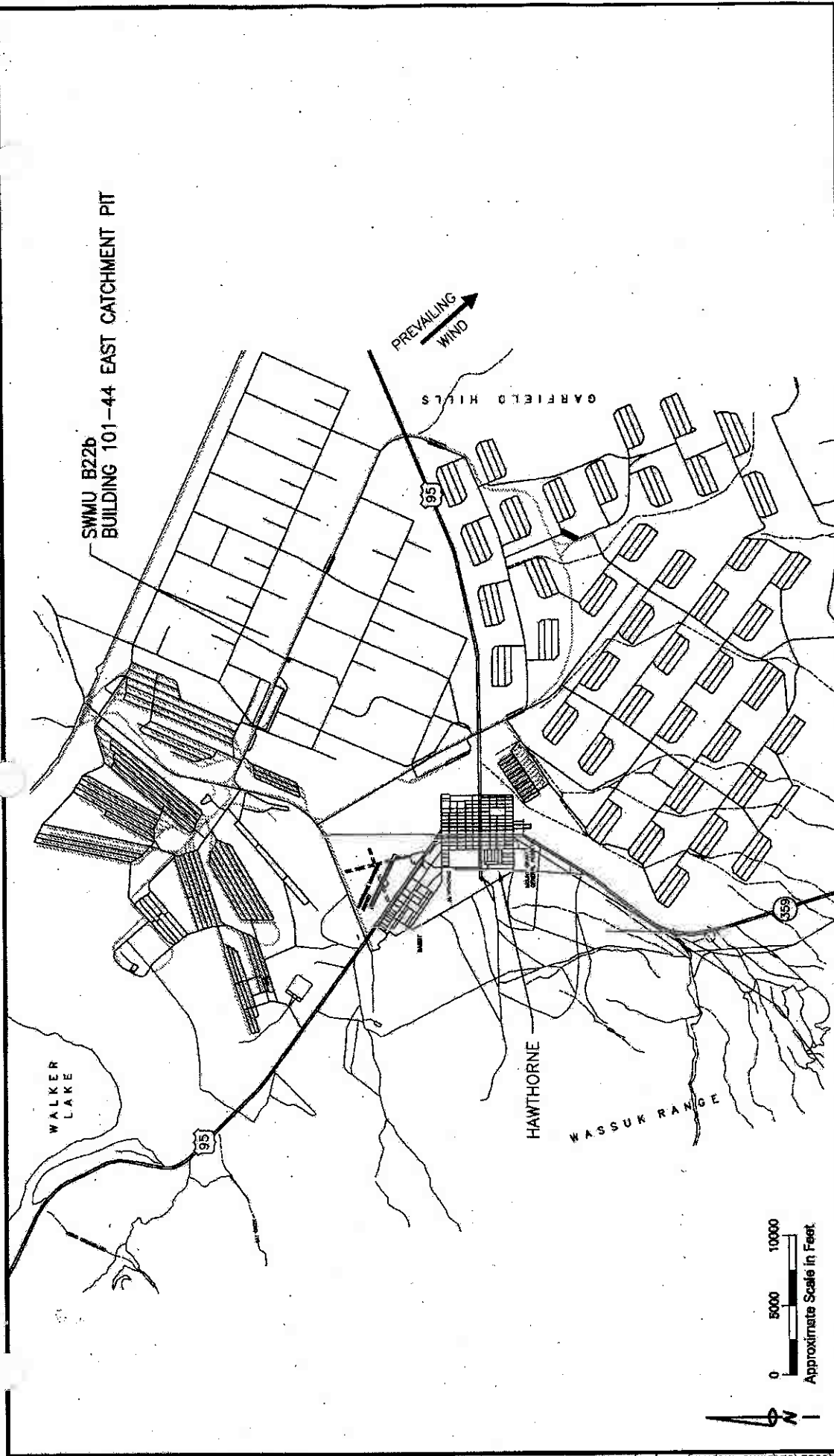


USATHAMA. 1977. Installation Assessment of Naval Ammunition Depot, Hawthorne, Nevada. U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland. Records Evaluation Report No. 114.

USEPA. 1989. Risk Assessment Guidance for Superfund. Volume I Human Health Evaluation Manual (Part A). December 1989.

\_\_\_\_\_. 1996. Region IX Preliminary Remediation Goals. USEPA Region IX. August 1996.

WaterWork. 1990. Hawthorne Army Ammunition Plant, Area 101 Surface Impoundments, Field and Lab Data and Analysis, Attachment 1-8.



SOURCE: TETRA TECH FINAL DATA PACKAGE, 1996 (REV. 1997)

## Site Location Map

**SWMU B22b**

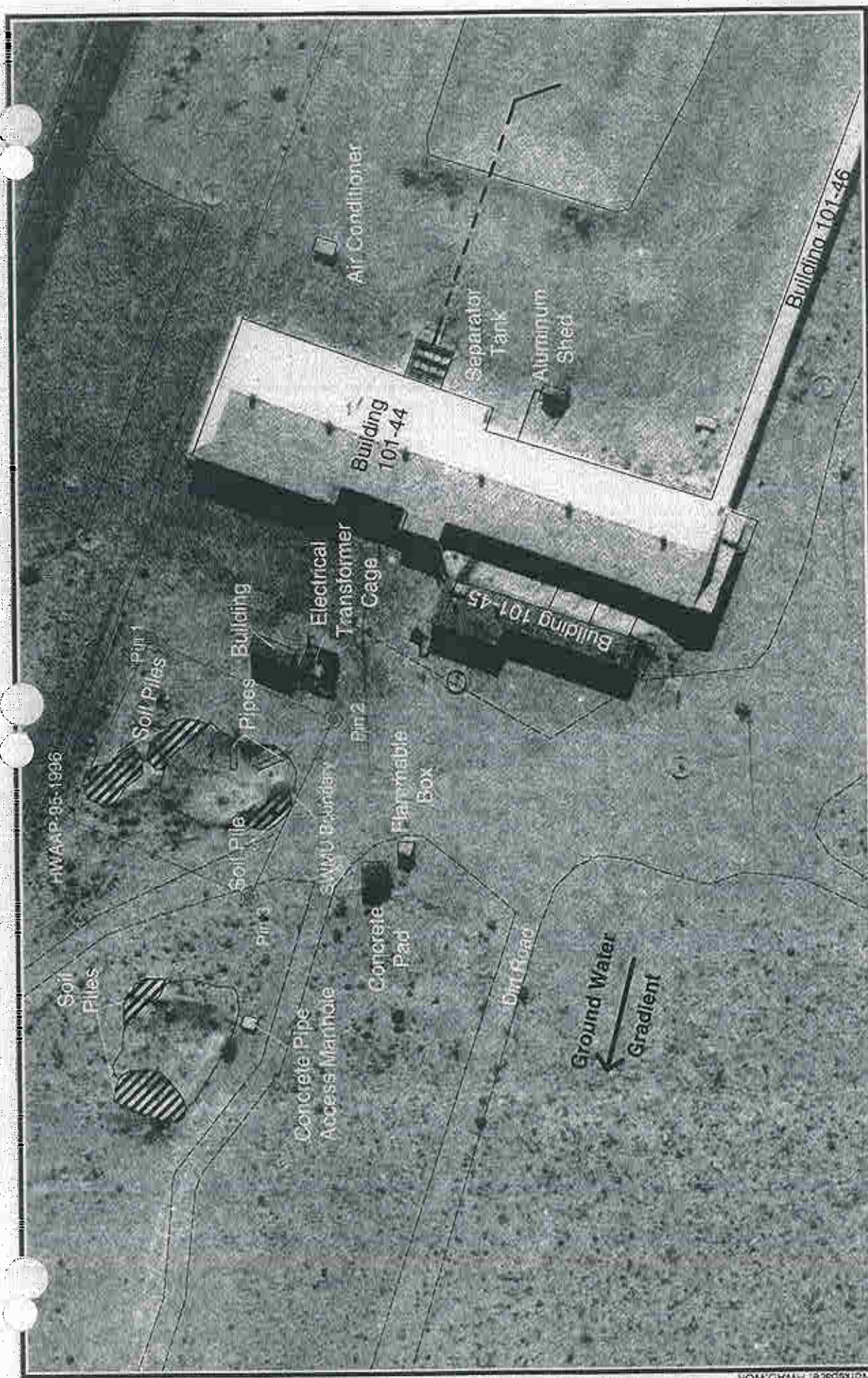
**Building 101-44 East Catchment Pit**

Hawthorne Army Depot

Hawthorne, Nevada

**Figure 1-1**



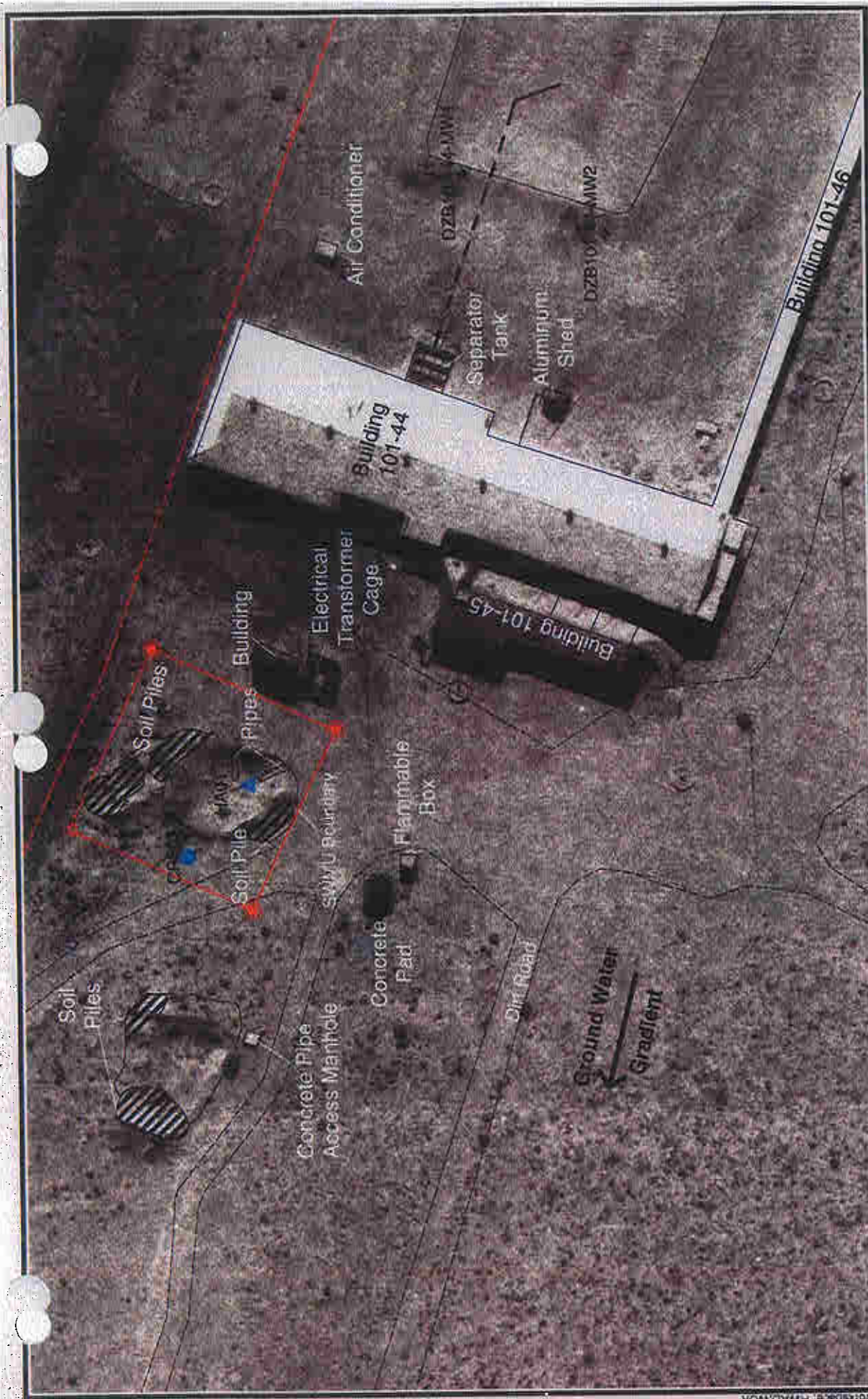


**Site Map**  
**SWMU B22b**  
**Building 101-44 East Catchment Pit**  
 Hawthorne Army Depot  
 Hawthorne, Nevada  
**Figure 1-2**

**Legend:**

- Boundary Corner Pin
- - - Drain Line
- ++++ Railroad
- △ SWMU Monument





**Investigation Activity Map**  
**SWMU B22b**  
**Building 101-44 East Catchment Pit**  
 Hawthorne Army Depot  
 Hawthorne, Nevada  
**Figure 3-1**



## **Appendix A**

Proposed Closure Goals  
Hawthorne Army Depot  
Hawthorne, Nevada

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-Carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/Kg)	HWAD Proposed Closure Goal Source
Nitrate	Anion	NC	128,000	Calculated Subpart S <sup>a</sup>
2-Amino-dinitrotoluene	Explosive	NC	-	NA <sup>a</sup>
4-Amino-dinitrotoluene	Explosive	NC	-	NA
1,3-Dinitrobenzene	Explosive	NC	8	Calculated Subpart S
2,4-Dinitrotoluene	Explosive	NC	160	Calculated Subpart S
2,6-Dinitrotoluene	Explosive	NC	80	Calculated Subpart S
HMX	Explosive	NC	4,000	Calculated Subpart S
Nitrobenzene	Explosive	NC	40	Calculated Subpart S
Nitrotoluene (2-, 3-, 4-)	Explosive	NC	800	Calculated Subpart S
RDX	Explosive	NC	64	Calculated Subpart S
Tetryl	Explosive	NC	800	Calculated Subpart S
1,3,5-Trinitrobenzene	Explosive	NC	4	Calculated Subpart S
2,4,6-Trinitrotoluene	Explosive	C	233	Calculated Subpart S
Aluminum	Metal	NC	80,000	Calculated Subpart S
Arsenic (cancer endpoint)	Metal	C & NC	30	Background <sup>a</sup>
Barium and compounds	Metal	NC	5,600	Calculated Subpart S
Beryllium and compounds	Metal	C	1	Background
Cadmium and compounds	Metal	NC	40	Calculated Subpart S
Chromium III and compounds	Metal	NC	80,000	Calculated Subpart S
Lead	Metal	NC	1000	PRG <sup>a</sup>
Mercury and compounds (inorganic)	Metal	NC	24	Calculated Subpart S
Selenium	Metal	NC	400	Calculated Subpart S
Silver and compounds	Metal	NC	400	Calculated Subpart S
Acenaphthene	PAH	NC	4,800	Calculated Subpart S
Benzo[a]anthracene	PAH	C	0.96	Calculated Subpart S
Benzo[a]pyrene	PAH	C	0.10	Detection Limit <sup>a</sup>
Benzo[b]fluoranthene	PAH	C	0.96	Calculated Subpart S
Benzo[k]fluoranthene	PAH	C	10	Calculated Subpart S
Chrysene	PAH	C	96	Calculated Subpart S
Dibenz[ah]anthracene	PAH	C	0.96	Calculated Subpart S
Fluoranthene	PAH	NC	3,200	Calculated Subpart S
Fluorene	PAH	NC	3,200	Calculated Subpart S
Indeno[1,2,3-cd]pyrene	PAH	C	-	NA
Naphthalene	PAH	NC	3,200	Calculated Subpart S
Pyrene	PAH	NC	2,400	Calculated Subpart S
Total Petroleum Hydrocarbons as Diesel (TPH-d)	PAH	C	100	NOEP Level Clean-up <sup>a</sup>
Polychlorinated biphenyls (PCBs)	PCBs	C	25	TSCA <sup>a</sup>
Bis(2-ethylhexyl)phthalate (DEHP)	SVOC	C	1,600	Calculated Subpart S
Bromoform (tribromomethane)	SVOC	C	89	Calculated Subpart S

**Proposed Closure Goals  
Hawthorne Army Depot  
Hawthorne, Nevada**

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/kg)	HWAD Proposed Closure Goal Source
Butyl benzyl phthalate	SVOC	NC	15,000	Calculated Subpart S
Dibromochloromethane	SVOC	C	83	Calculated Subpart S
Dibutyl-phthalate	SVOC	NC	8,000	Calculated Subpart S
Diethyl phthalate	SVOC	NC	64,000	Calculated Subpart S
Phenanthrene	SVOC			NA
Phenol	SVOC	NC	48,000	Calculated Subpart S
Acetone	VOC	NC	800	Calculated Subpart S
Anthracene	VOC	NC	24,000	Calculated Subpart S
Benzene	VOC	C	24	Calculated Subpart S
Bis(2-chloroisopropyl) ether	VOC	C	3,200	Calculated Subpart S
Bromomethane	VOC	NC	112	Calculated Subpart S
Carbon tetrachloride	VOC	C	5	Calculated Subpart S
Chlorobenzene	VOC	NC	1,600	Calculated Subpart S
Chloroform	VOC	C	115	Calculated Subpart S
Chloromethane	VOC	C	538	Calculated Subpart S
Dibromomethane	VOC	C	0.008	Calculated Subpart S
1,2-Dichlorobenzene	VOC	NC	7,200	Calculated Subpart S
1,4-Dichlorobenzene	VOC	C	18,300	Calculated Subpart S
Dichlorodifluoromethane	VOC	C	16,000	Calculated Subpart S
Ethylbenzene	VOC	NC	8,000	Calculated Subpart S
Methylene bromide	VOC	NC	800	Calculated Subpart S
Methylene chloride	VOC	C	4,800	Calculated Subpart S
2-Methylnaphthalene	VOC			NA
1,1,2,2-Tetrachloroethane	VOC	C	35	Calculated Subpart S
Tetrachloroethylene (PCE)	VOC	C & NC	800	Calculated Subpart S
Toluene	VOC	NC	16,000	Calculated Subpart S
1,1,1-Trichloroethane	VOC	NC	7,200	Calculated Subpart S
Trichloroethylene (TCE)	VOC	C & NC	480	Calculated Subpart S
Trichlorofluoromethane	VOC	NC	24,000	Calculated Subpart S
1,2,3-Trichloropropane	VOC	C	480	Calculated Subpart S
Vinyl chloride	VOC	C	0.37	Calculated Subpart S
Xylene Total (m-, o-, p-)	VOC	NC	160,000	Calculated Subpart S
2,3,7,8-TCDD	Dioxin	C	0.000005	Calculated Subpart S

<sup>a</sup> RCRA 55 FR 30870

<sup>b</sup> Not available

<sup>c</sup> Highest background concentration detected in 50 background soil samples

<sup>d</sup> Smucker, Stanford J. USEPA Region IX, Preliminary Remedial Goals, Second Half, Sep. 1995

<sup>e</sup> Method detection limit for Volatile Organic Compounds by EPA Method 8260 or

Semi-Volatile Organic Compounds analyzed by EPA Method 8270

<sup>f</sup> Nevada Division of Environmental Protection

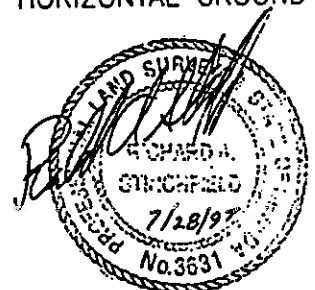
<sup>g</sup> Cleanup level for PCB spills in accordance with Toxic Substance and Control Act Spill Policy Guidelines 40 CFR 761

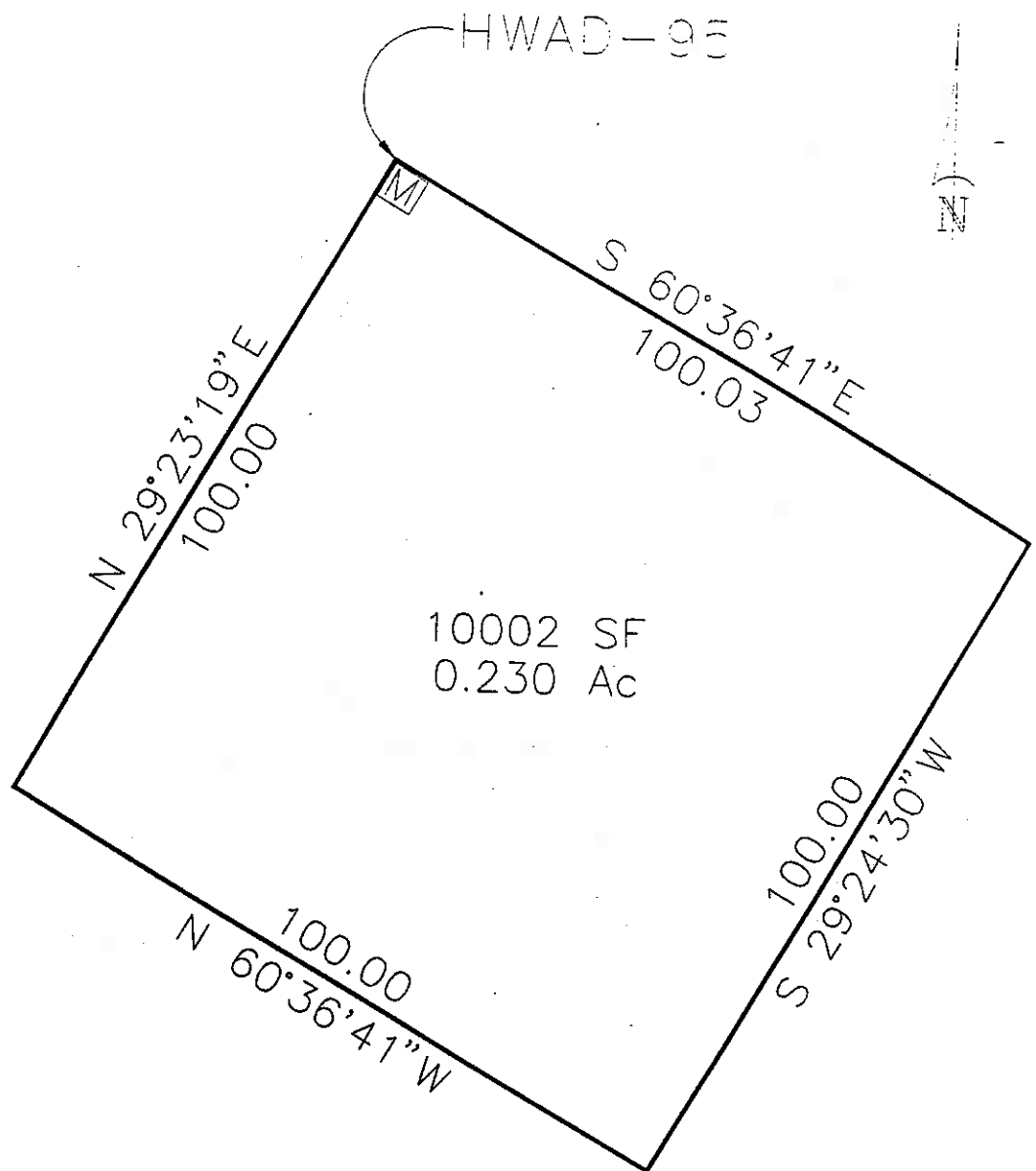
## **Appendix B**



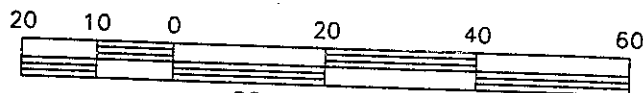
## NOTES

1. FOR THE LOCATION OF THE FOLLOWING SWMU'S, REFER TO FIGURE 3-6 OF THE "FINAL R.C.R.A. FACILITY INVESTIGATION REPORT OF GROUP "A" SOLID WASTE MANAGEMENT UNITS A-04, B-16, B-21, B-24, B-26, AND H-01".
2. THE "HWAD" MONUMENTS AS SHOWN HEREIN AS "M", ARE A 1' X 1' X 2'+ CONCRETE MONUMENT WITH A BRASS CAP STAMPED AS PER SPECIFICATIONS. ALL OF THE OTHER CORNERS ARE MARKED BY A 5/8" RE-BAR WITH A PLASTIC CAP STAMPED "STINCHFIELD PLS 3631" UNLESS NOTED OTHERWISE ON THE MAPS.
3. HORIZONTAL DATUM IS BASED ON NAD 83(1994) AND MORE SPECIFICALLY, NGS STATION "W 2". "W 2" IS A FEDERAL BASE NETWORK CONTROL STATION AND IS LOCATED IN THE APPROXIMATE CENTER OF THIS PROJECT.
4. VERTICAL DATUM IS BASED ON NAVD 29. NAVD 88 ELEVATIONS HAVE BEEN SCALED AND THEREFORE ARE NOT ACCURATE. VERTICAL CONTROL USING GPS WAS USED TO ESTABLISH THE ELEVATIONS OF THE EXISTING CONTROL POINTS AND THE "HWAD" MONUMENTS. THE VALUE OF NGS STATION "W 2" WAS USED AS A BASIS FOR THE VERTICAL CONTROL.
5. COORDINATE VALUES OF EXISTING NGS CONTROL, TRAVERSE POINTS, AND HWAD MONUMENTS ARE STATE PLANE COORDINATES, WEST ZONE.
6. THE COMBINED FACTOR WAS CALCULATED USING THE FOLLOWING FIGURES. THE "MAP SCALE" AT POINT "W 2" IS 0.99990022, THE MEAN ELEVATION OF THE TOTAL PROJECT WAS TAKEN AS 4150.00 FEET ABOVE SEA LEVEL AND THE MEAN RADIUS OF THE EARTH WAS TAKEN AS 20,906,000 FEET. THE SEA LEVEL FACTOR WAS CALCULATED AS FOLLOWS:  $20,906,000 / 20,906,000 + 4150.00 = 0.999801532$ . THE COMBINED FACTOR (CF) WAS CALCULATED AS FOLLOWS:  $0.99990022 \times 0.999801532 = 0.999701772$ .
7. GROUND DISTANCE X CF (0.999801532) = GRID DISTANCE.
8. GRID DISTANCE X INVERSE CF (1.00298317) = GROUND DISTANCE.
9. COORDINATE VALUES OF ALL OTHER POINTS INCLUDING SWMU CORNERS OTHER THAN "HWAD" MONUMENTS, REFERENCE POINTS, TEST PIT OR HOLE LOCATIONS ETC., WERE CALCULATED USING GROUND DISTANCES AND ARE THEREFORE NOT TRUE STATE PLANE COORDINATES.
10. DISTANCES AS SHOWN ON THESE SWMU'S ARE HORIZONTAL GROUND DISTANCES.

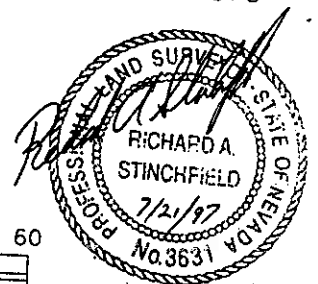




NW COR	N	14510985.785	E	2626341.557	ELEV	4246.952
NE COR	N	14510936.695	E	2626428.718	ELEV	4247.741
SE COR	N	14510849.581	E	2626379.615	ELEV	4247.130
SW COR	N	14510898.654	E	2626292.484	ELEV	4246.578



SCALE IN FEET



SWMU B22b Survey Data  
Hawthorne Army Depot  
Hawthorne, Nevada

SWMU	Point ID	Northing (feet)	Easting (feet)	Elevation
B22b	HA01	1387568.57	501969.76	4241.401
B22b	CPS01	1387600.56	501936.06	4246.465
B22b	Pin 3	1387571.20	501906.54	4246.578
B22b	Pin 2	1387522.13	501993.67	4247.13
B22b	Pin 1	1387609.24	502042.77	4247.741
B22b	HWAAP-95-1996	1387658.33	501955.61	4246.952

Notes:

Coordinate data based on electronic map file using the NAD 1927 datum.

Elevation data based on surveyors map using NGVD 1929 datum.

## **Appendix C**

Metals  
Method 6010A (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium Total mg/kg	Silver mg/kg	Arsenic mg/kg	Lead mg/kg	Selenium mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	84	<0.52	<0.52	5.1	<1	NA	NA	NA
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	72	<0.5	<0.5	9.5	<1	4.2	17	<0.5
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	79	<0.53	<0.53	6.8	<1.1	3.3	6.1	<0.53
Analyses					3	3	3	3	3	2	2	2
Detections					3	0	0	3	0	2	2	0
Minimum Concentration					72	0	0	5.1	0	3.3	6.1	0
Maximum Concentration					84	0	0	9.5	0	4.2	17	0
HWAD - PCG				2000	1	20	20	20	100	100	100	20
HWAD - PCG Hits				0	0	0	0	0	0	0	0	0

Notes:

NA = Not analyzed

Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Arsenic  
Method 7060 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Arsenic
					mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	3
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	4.2
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	3.3
Analyses					3
Detections					3
Minimum Concentration					3
Maximum Concentration					4.2
HWAD - PCG					100
HWAD - PCG Hits					0

Lead  
Method 7421 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Lead
					mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	4.1
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	17
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	6.1
Analyses					3
Detections					3
Minimum Concentration					4.1
Maximum Concentration					17
HWAD - PCG					100
HWAD - PCG Hits					0

Mercury  
Method 7471 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Mercury
					mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	<0.1
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	<0.1
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<0.11

Analyses	3
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	24
HWAD - PCG Hits	0

Note:

Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.



Selenium  
Method 7740 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Selenium
					mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	<0.52
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	<0.5
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<0.53

Analyses	3
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	20
HWAD - PCG Hits	0

Note:

Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Explosives  
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	2,4,6-TNT	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-DNT	2-Nitrotoluene	3-Nitrotoluene	4-Amino-2,6-DNT	4-Nitrotoluene	HMX
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
Analyses					3	3	3	3	3	3	3	3	3
Detections					0	0	0	0	0	0	0	0	0
Minimum Concentration					0	0	0	0	0	0	0	0	0
Maximum Concentration					0	0	0	0	0	0	0	0	0
HWAD - PCG					233	2.6	80	NE	800	800	NE	800	4000
HWAD - PCG Hits					0	0	0	NE	0	0	NE	0	0

Notes:

NE = Not established

Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Explosives  
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	m-Dinitrobenzene mg/kg	Nitrobenzene mg/kg	RDX mg/kg	sym-Trinitrobenzene mg/kg	Tetryl mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	<1	<1	<1	<1	<1
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	<1	<1	11	<1	<1
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<1	<1	<1	<1	<1
Analyses					3	3	3	3	3
Detections					0	0	1	0	0
Minimum Concentration					0	0	11	0	0
Maximum Concentration					0	0	11	0	0
HWAD - PCG					8	40	64	4	800
HWAD - PCG Hits					0	0	0	0	0

Notes:

NE = Not established

Zero values listed for maximum and minimum concentrations indicate a no

Picric Acid  
Method 8330M (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Picric Acid
					mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	<0.25
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	<0.25
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<0.25
Analyses					3
Detections					0
Minimum Concentration					0
Maximum Concentration					0
HWAD - PCG					NE
HWAD - PCG Hits					NE

Notes:

NE = Not established

Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Nitrate/Nitrite  
Method 9200 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Nitrate-Nitrogen mg/kg
B22B-CPS1-1-007.5	CPS01	4/4/91	7.5	ASC	8.8
B22B-CPS1-1-009.5	CPS01	4/4/91	9.5	ASC	17
B22B-CPS2-1-007.5	CPS01	4/4/91	7.5	ASC	<1.1
Analyses					3
Detections					2
Minimum Concentration					8.8
Maximum Concentration					17
HWAD - PCG					128000
HWAD - PCG Hits					0

## **Appendix D**

Applied P & Ch Laboratory

13760 Magnolia Ave. Chino CA 91710

Tel: (909) 590-1828 Fax: (909) 590-1498  
Submitted to:

Tetra Tech, Inc. (San Francisco)

Attention: Roy Roenbeck

180 Howard St. Ste. 250

San Francisco CA 94105

Tel: (415) 974-1221 Fax: (415) 974-5914

# APCL Analytical Report

Service ID #: 801-992449

Collected by: GM/FH

Collected on: 03/09-10/99

Received: 03/12/99

Extracted: 03/17/99

Tested: 03/17-22/99

Reported: 03/24/99

Sample Description: Soil from Hawthorne

Project Description: HAWD-101

## Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result			
				<del>CS07-BB-01</del> <del>99-02449-1</del>	<del>CS07-SA-01</del> <del>99-02449-2</del>	<del>CS07-SA-02</del> <del>99-02449-3</del>	<del>CS07-SA-03</del> <del>99-02449-4</del>
MOISTURE	ASTM-D2216	%Moisture	0.5	16.5	1.4	1.3	1.3
NITROAROMATICS AND NITROAMINES <sup>(a)</sup>							
Dilution Factor				1	50	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.24	<10	<0.20	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.24	<10	<0.20	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
HMX	8330	mg/kg	0.25	0.30	76	<0.25	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
RDX	8330	mg/kg	0.25	0.3J	599	<0.25	<0.25
TETRYL	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.1J	<13	<0.25	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.30	<13	<0.25	<0.25

Component Analyzed	Method	Unit	PQL	Analysis Result			
				<del>CS07-SA-04</del> <del>99-02449-5</del>	<del>CS07-SA-05</del> <del>99-02449-6</del>	<del>CS07-SW-01</del> <del>99-02449-7</del>	<del>CS07-SW-02</del> <del>99-02449-8</del>
MOISTURE	ASTM-D2216	%Moisture	0.5	1.0	1.1	1.8	1.4
NITROAROMATICS AND NITROAMINES <sup>(a)</sup>							
Dilution Factor				5	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<1.0	<0.20	<0.20	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<1.0	<0.20	<0.20	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
HMX	8330	mg/kg	0.25	16	<0.25	<0.25	<0.25
NITROBENZENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
RDX	8330	mg/kg	0.25	43	<0.25	<0.25	<0.25
TETRYL	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.6J	<0.25	<0.25	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<1.3	<0.25	<0.25	<0.25

## APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result		
				<del>CS30-SW-02</del> <del>99-02449-24</del>	<del>CS30-SW-03</del> <del>99-02449-25</del>	<del>CS30-SW-04</del> <del>99-02449-26</del>
NITROAROMATICS AND NITROAMINES (a)						
Dilution Factor				1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.21	<0.21
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.21	<0.21
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
HMX	8330	mg/kg	0.25	0.32	<0.26	0.26
NITROBENZENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
3-NITROTOLUENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
RDX	8330	mg/kg	0.25	9.05	0.33	0.48
TETRYL	8330	mg/kg	0.25	<0.27	<0.26	<0.26
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.27	<0.26	<0.26

Component Analyzed	Method	Unit	PQL	Analysis Result		
				<del>CS30-SW-05</del> 99-02449-27	<del>SS22-99-01</del> 99-02449-28	SS22-99-02 99-02449-29
<b>MOISTURE</b>	ASTM-D2216	%Moisture	0.5	2.6	1.1	1.4
<b>NITROAROMATICS AND NITROAMINES</b>						
Dilution Factor				1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.20	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.20	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
HMX	8330	mg/kg	0.25	<0.26	<0.25	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
RDX	8330	mg/kg	0.25	<0.26	<0.25	<0.25
TETRYL	8330	mg/kg	0.25	<0.26	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25	<0.25

PQL: Practical Quantitation Limit. MDL: Method Detection Limit.

N.D.: Not Detected or less than the practical quantitation limit.

J: Reported between PQL and MDL.

† All results are reported on dry basis for soil samples.

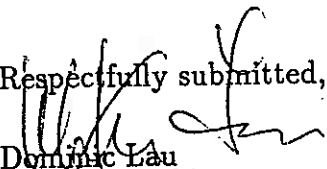
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0

(a) Positive results had been confirmed by second column.

CRDL: Contract Required Detection Limit

"-": Analysis is not required.

Respectfully submitted,

  
 Dominic Lau  
 Laboratory Director  
 Applied P & Ch Laboratory



Applied P & Ch Laboratory

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**APCL Analytical Report**

Service ID #: 801-994595

Received: 07/02/99

Collected by: D. Gonzalez

Extracted: 07/06/99

Collected on: 06/29-30/99

Tested: 07/06-09/99

Reported: 07/12/99

Sample Description: Soil and Water

Project Description: W 101 Bioremediation

**Analysis of Water and Soil Samples****I. Analysis of Water Samples**

Component Analyzed	Method	Unit	PQL	Analysis Result
				CH-002000-1010-1
				99-04595-16
NITROAROMATICS AND NITROAMINES				
Dilution Factor				3.85
1 AMINO-2,6-DINITROTOLUENE	8330	µg/L	10	<38
2-AMINO-4,6-DINITROTOLUENE	8330	µg/L	10	<38
1,4-DINITROBENZENE	8330	µg/L	4	<15
2,4-DINITROTOLUENE	8330	µg/L	5.7	<22
2,6-DINITROTOLUENE	8330	µg/L	9.4	<38
HMX	8330	µg/L	13	4J
NITROBENZENE	8330	µg/L	6.4	<24
3-NITROTOLUENE	8330	µg/L	7.9	<30
RDX	8330	µg/L	14	23.1
TETRYL	8330	µg/L	4	<15
1,3,5-TRINITROBENZENE	8330	µg/L	7.3	<28
2,4,6-TRINITROTOLUENE	8330	µg/L	6.9	31
2-NITROTOLUENE (a)	8330	µg/L	8.5	<32
4-NITROTOLUENE (a)	8330	µg/L	8.5	<32
Dilution Factor				3.85
PICRIC ACID	M8330	µg/L	10	<38

**II. Analysis of Soil Samples**

Component Analyzed	Method	Unit	PQL	Analysis Result	
				101044-B22A-CF001-05-P 99-04595-1	101044-B22A-CF003-05-P 99-04595-3
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	1.8	15.4

## APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result	
				<del>101044-B22A-GF001-05-P</del> 99-04595-1	<del>101044-B22A-GF002-05-P</del> 99-04595-2
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.24
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.24
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.30
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
HMX	8330	mg/kg	0.25	<0.25	<0.30
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.30
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
RDX	8330	mg/kg	0.25	<0.25	<0.30
TETRYL	8330	mg/kg	0.25	<0.25	<0.30
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.30
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
2-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.25	<0.30
4-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.25	<0.30

Component Analyzed	Method	Unit	PQL	Analysis Result	
				101044-B22B-GF001-05-P 99-04595-3	101044-B22B-GF002-05-P 99-04595-4
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	0.8	0.6
<b>NITROAROMATICS AND NITROAMINES</b>					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
HMX	8330	mg/kg	0.25	<0.25	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
RDX	8330	mg/kg	0.25	<0.25	<0.25
TETRYL	8330	mg/kg	0.25	<0.25	0.06J
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
2-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.25	<0.25
4-NITROTOLUENE (a)	8330	mg/kg	0.25	<0.25	<0.25

Component Analyzed	Method	Unit	PQL	Analysis Result	
				101044-B22B-GF003-05-P 99-04595-5	A2-SMB06-S018-P 99-04595-6
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	1	1.7

## **Appendix E**



**SWMU B-22b:** Facing southeast towards impoundment. A 3" galvanized steel pipe and a 1.5" PVC pipe protruding from the southwest slope of the impoundment. A 3" PVC pipe is located on the southeast slope of the impoundment. Buildings 101-44 and 101-45 are in the background. RIN10. 9/26/94.



**SWMU B-22b:** Facing north. 2 large dredge piles on eastern side of impoundment. RIN11. 9/26/94.



**SWMU B-22b February 2000**